R 3712

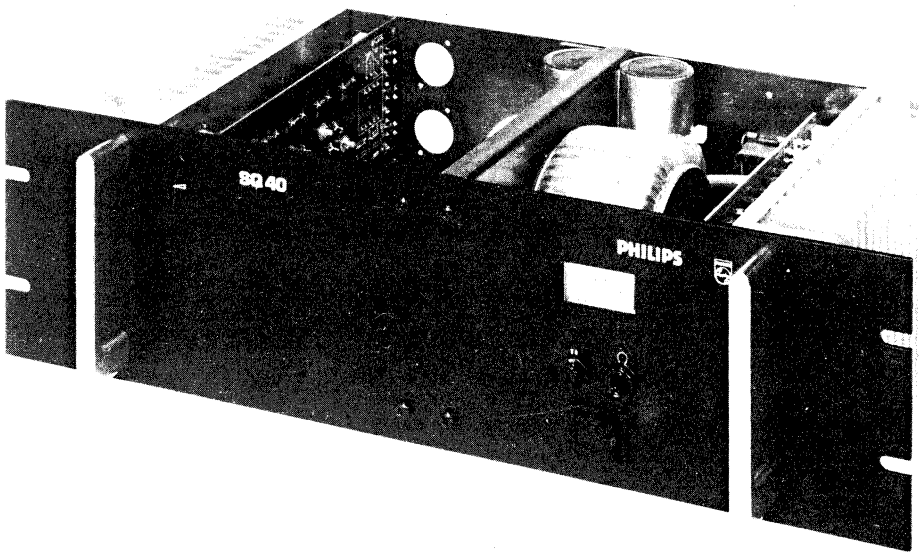
Service Manual

LBB 1303 LBB 1304
LBB 1305 LBB 1307

SCHALTUNGSDIENST LANGE BERLIN
BELEGEXEMPLAR
PHILIPS AVS-SERVICE

LFDNR.: 1073

Power Amplifiers



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PHILIPS

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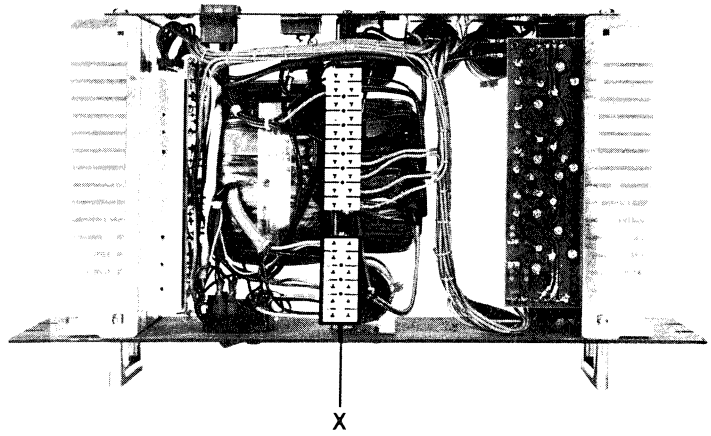
100W POWER AMPLIFIER LBB 1303 mains operated

150W POWER AMPLIFIER LBB 1305 battery operated

200W POWER AMPLIFIER LBB 1304 mains operated

400W POWER AMPLIFIER LBB 1307 mains operated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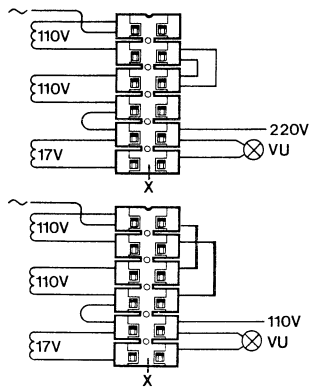
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220V
VU
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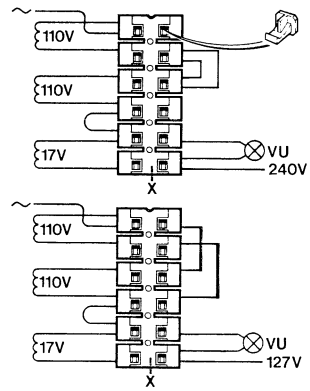
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17V
VU
240V
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17V
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VU
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VU
127V
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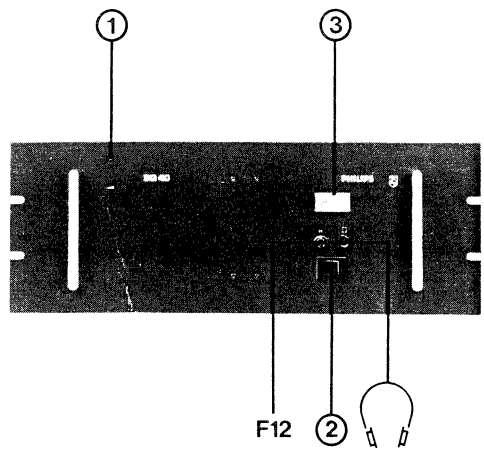
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3
F12
2

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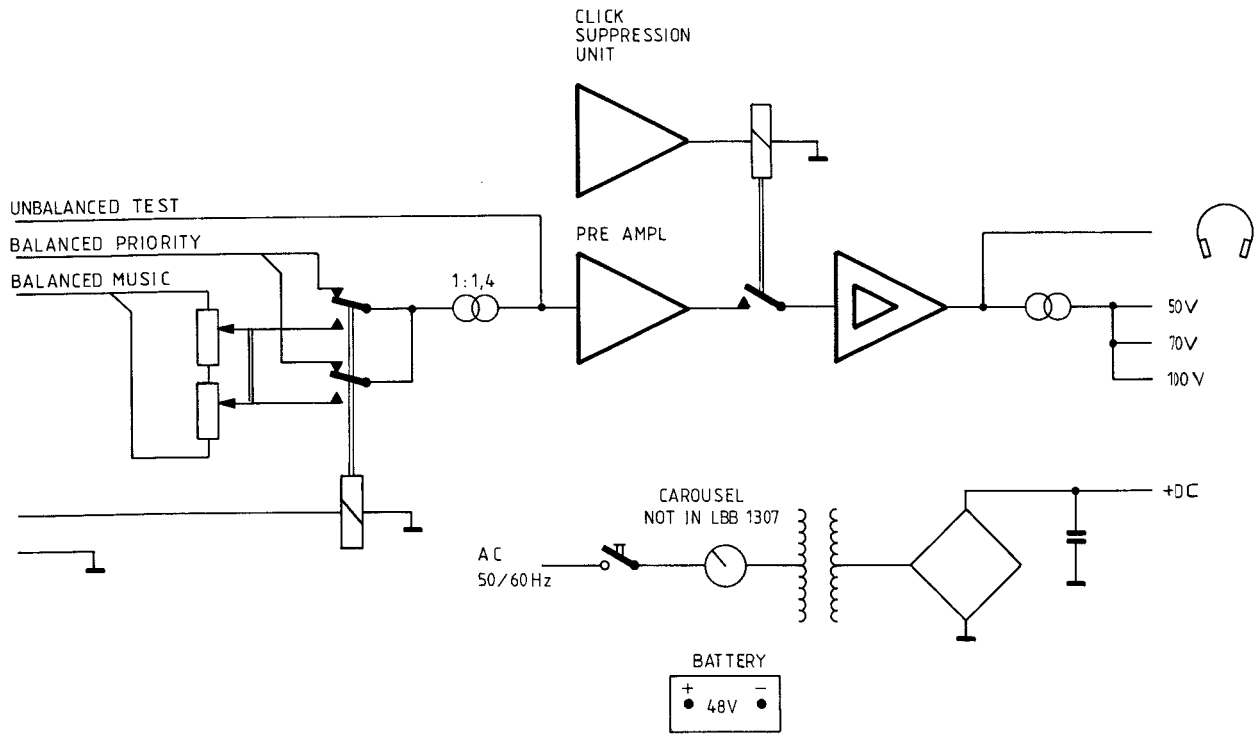
LAY OUT PRINT BOARD

1. GENERAL

The LBB 1303/1305/1304/1307 is a high qualified 100W/150W/200W/400W mono a.c./d.c. Power Amplifier specially made for reinforcement purposes and suitable for 19" rack mounting.

Remark:
The LBB 1305 is only suitable for d.c. +48V operation.

1.1 BLOCK DIAGRAM



2. TECHNICAL DATA

	LBB 1303 100W	LBB 1305 150W	LBB 1304 200W	LBB 1307 400W
Construction				
19" rack mounting				
3HE	x	x	x	
4HE				x
VU indicator				
Indicates the voltages before output transformer				
0 mark is 40V ± 0,5dB on 100V at 1 kHz	x	x	x	x
Connectors				
Input:				
Three 5-pole 180° DIN sockets and three spare holes for XLR sockets.	x	x	x	x
Output:				
12-pole MATE-N-LOK connector				
For				
100V 70V 50V outputs	x	x	x	x
100 ohm 50 ohm 25 ohm	x			
67 ohm 33 ohm 25 ohm		x		
50 ohm 25 ohm 12,5 ohm			x	
25 ohm 12,5 ohm 6,3 ohm				x
1 headphone socket on front panel 6,3mm				
Fuses				
Fuse holder in front of the Amplifider Fig. 3 F12 and on the A/B PCB boards Fig. 4 F1-F81. The Supply transformer has a self restoring thermal fuse Klixon (non replacable).	x	x	x	x
Note: The thermal cut-out operates on the primary winding of the mains transformer and although the pilot lamp in the VU meter extinghuishes, the full mains voltage is still present inside the amplifier.				
Values				
220/240Va.c. 110/127Va.c. PCB boards d.c.				
T 2,5A T 5A T 5,0A	x			
T 5 A T 10A T 5,0A			x	
T10 A T 20A T 5,0A				x
T 5,0A		x		

	LBB 1303 100W	LBB 1305 150W	LBB 1304 200W	LBB 1307 400W
Mains voltage				
All amplifiers are delivered ready for use on 220V mains voltage. Max. deviation ± 10% 50/60Hz mains voltage can be changed by rotating carousel for 110V, 127V and 245V except LBB 1307A.	x		x	see circuit diagram (fig. 1-2)
Power consumption				
Rated power output (and + 10% mains voltage)				
260VA	x			
265VA (+48Vd.c.)		x		
520VA			x	
880VA				x
Weight approx. 9,2 kg	x			
8,5 kg		x		
12,4 kg			x	
18,3 kg				x
Distortion				
At rated power for all Amplifiers THD at 1 kHz < 0,5%	x	x	x	x
Output impedance				
100V tap 70V tap 50V tap				
17 ohm 8,5 ohm 4,25 ohm	x			
12 ohm 6,5 ohm 3,5 ohm		x		
8,5 ohm 4,25 ohm 2,1 ohm			x	
3 ohm 115 ohm 0,75 ohm				x
Protection				
The output is protected against any misloading and short circuiting	x	x	x	x
Signal-to-noise				
> 85dB at rated power on 100V tap unweighted 20 - 20000Hz source impedance 2 kOhm preset control fully open	x	x	x	x
Frequency response				
at rated power - 10dB 50 - 20000Hz - 3dB	x	x	x	x

	LBB 1303 100W	LBB 1305 150W	LBB 1304 200W	LBB 1307 400W
Input and interconnections				
1 symmetrical music input (by activating one contact to earth of relay K1)				
2 symmetrical priority input				
3 asymmetrical test input	x	x	x	x
Input impedance $\geq$ 10 kOhm				
For rated power input sensitivity on priority input 500mV (-3,8dBm) max. input 3V (+12dBm) on music input.	x	x	x	x
External d.c. supply				
All Power Amplifiers can be supplied with +48Vd.c.				
Note: the LBB 1305 can only be supplied with d.c. voltage.	x	x	x	x
Suppression				
Amplifier is provided with a click suppression circuit.	x	x	x	x
Working ambient temperature -10° - +45°C	x	x	x	x

3. INSTALLATION AND OPERATION

Battery supply

The amplifier is prepared for an emergency external battery supply of +48V. The battery supply is connected via the Mate-N-Lok connector on the rear panel. See fig. 5. A protection circuit is incorporated to prevent any damage to the amplifier which may otherwise be caused by inadvertent reversal of the battery supply polarity.

Note:
Even when operated from external batteries, it is still advised, because of the presence of high voltage, to earth the amplifier.

Earthing

On delivery the electrical and mechanical earths of the amplifier are not connected together. When an amplifier is used alone, the electrical and mechanical earths should be joined together by linking poles 2 and 3 on the Mate-N-Lok connector on the rear panel. A wire link complete with Mate-N-Lok terminals is supplied on delivery.

Earthing amplifier combinations

When two or more amplifiers are used in a system, it is necessary to ensure that earth loops and the associated problem of hum on the output signal are not introduced by the earth wiring. In this case,

terminal 2 on all amplifiers should be linked together and joined by one wire link to terminal 3 on one amplifier only.

Cooling

To ensure adequate cooling of all units mounted in a 19" rack when there is no spacing between units and when there is no forced air cooling, only the following numbers of amplifiers should be mounted together:

LBB 1303/00 100W : max. 4 units
LBB 1304/00 200W : max. 4 units
LBB 1307/00 400W : max. 2 units

These limitations are based upon an output power of -8dB nominal, an ambient temperature of +45°C, and a mains supply voltage of 242V.

Connections

Inputs
See fig. 5.
1. Priority input
   5-pole 180° DIN socket
   Pole 1 : Signal core
   Pole 2 : Electrical earth screen
   Pole 3 : Signal core
   Pole 4 : not connected
   Pole 5 : Remote control
Note:
Music input activated by shorting poles 2 and 5. Priority input activated with poles 2 and 5 not connected.

2. Music input
   5-pole 180° DIN socket
   Pole 1 : Signal core
   Pole 2 : Electrical earth screen
   Pole 3 : Signal core
   Pole 4 : not connected
   Pole 5 : Remote control
Note:
Priority input activated with poles 2 and 5 not connected. Music input activated with poles 2 and 5 connected.

3. Test signal input
   5-pole 180° DIN socket
   Pole 1 : Test signal core
   Pole 2 : Return core (screen)
   Poles 3, 4 and 5: not connected

Outputs
4. Output terminal block
   12-pole Mate-N-Lok (see fig. 5)
   Pole 1 : +48V External battery supply
   Pole 2 : Electrical earth
   Pole 3 : Mechanical earth

Pole 4 : -0V External battery supply
Pole 5 : not connected
Pole 6 : not connected
Pole 7 : 50V Loudspeaker output
Pole 8 : 70V Loudspeaker output
Pole 9 : 100V Loudspeaker output
Pole 10 : 0V Loudspeaker output
Pole 11 : not connected
Pole 12 : not connected (prepared for the "A" wire of a 100V system)

Headphone socket (see fig. 3)
6.3mm standard jack socket

Controls (see fig. 3)
1. Sensitivity control pre-set for input 2
2. Mains on/off switch
3. Output level VU-meter plus illuminated scale (mains on)
(replacement lamp - Philips type 8097D, E10, 20V, 0.1A
- Service code no. 4822 134 40015)

Loudspeakers for 100, 70 or 50V system (see fig. 6)

Loudspeakers with suitable matching transformers can be connected in parallel to the 100V, 70V or 50V output so that the total loudspeaker power does not exceed the nominal output power rating of the amplifier. 100V loudspeakers connected to the 100V output will consume their nominal power. If, however, 100V loudspeakers are connected to the 70V output, then the loudspeaker's power consumption will be equal to one half of their nominal rated power. This means that twice as many loudspeakers (all having the same nominal power rating) can be connected without overloading the amplifier.

Similarly, if 100V loudspeakers are connected to the 50V output they will only consume a quarter of their nominal power and an increase of up to four times as many loudspeakers as possible.

In-phase connection of loudspeakers

Disturbing effects can occur, particularly when loudspeakers are mounted close together, which are caused by the loudspeakers being connected in anti-phase. To ensure an in-phase connection, all similarly marked loudspeaker terminals (in most cases one terminal is marked with a red dot) must be connected to the same wire on the distribution cable. See fig. 6.

Parallel connection of amplifier inputs

The pre-amplifier output, of, for example, a mixing amplifier, may be connected to the input of this amplifier and to the input of several other power amplifiers. Public Address system arrangements of pratically any wattage can be built by using this method of connection.

Connectors

Fig. 7 3 x 5-pole 180° DIN plugs
Fig. 8 1 x 12-pole Mate-N-Lok connector

On delivery, the amplifier is supplied with a small plastic bag containing a 12-pole Mate-N-Lok block complete with contact pins and cable clamp plus a contact pin ejector tool. Also included is a wire link for interconnecting the electrical and mechanical earths.

When fitting the contact pins to the external wiring, they may be either soldered or crimped.

4. CIRCUIT DESCRIPTION

The Power Amplifier has 3 inputs:
1. Balance transformer priority input
2. Balance transformer input which can be adjusted with a preset potentiometer on the front of the unit
3. Direct input, only used for test procedures

From the input connector the signal is fed, via transformer T1, to amplifier IC1 and then to the differential transistors TS3 and TS4. In front of TS3 and TS4 a relay contact is provided to avoid clicks from the loudspeakers when switching on and off. Comparator IC2 drives TS2 to operate relay K2. When the power goes on TS1 conducts and point 3 of IC2 becomes higher in voltage than point 2, so point 5 is then a + voltage and TS2 is non conducting. In the meantime, C10 charging. The voltage on point 2 rises above point 3. At that moment, the voltage on point 5 changes from positive to negative and TS2 can conduct. Relay contact of K2 connects the signal to TS3 and TS4. When the power goes off, C10 discharges via R10 so that relay K2 drops out faster than the discharging of the main capacitors.

During the warming up of the amplifier TS6 is thermally connected with the output stage and protects against too much variation in the quiescent current. After a few minutes R28 can be adjusted for the final cross over point. When, for any reason, the output current increases too much, the voltage between the base and emittor of TS7 will rise to the value of 0,6V. The transistor TS7 can conduct and decrease the output voltage of the power transistors. The recovery time of the protection circuit is delayed by capacitor C17 and D11 and D13. The output of the amplifier is connected to an output transformer with 50V, 70V and 100V taps. The loudspeaker output connector BU18 is a multipole MATE-N-LOK type and provides connections for the loudspeakers, earth and battery operation. A VU indicator on the front of the unit is present to indicate the output voltage of the amplifiers. The VU indicator which is driven via a rectifier circuit is adjustable by means of potentiometer R47. A headphone jack B17 on front of the unit is also available.

5. REPAIRING METHODS

When the Power Amplifier does not work we suggest the following checks are made:

1. Check fuses
   If there is one blown, first disconnect amplifier from mains supply then unplug the board and disconnect the board from the mains heatsink, take care about the grease for the power transistors. The grease is removable with freon.

2. Measure with an ohmmeter between the emitter and collector of the power transistors, and the driver transistors TS9, TS10 and TS5.

3. Measure with an ohmmeter diodes D15, D16.

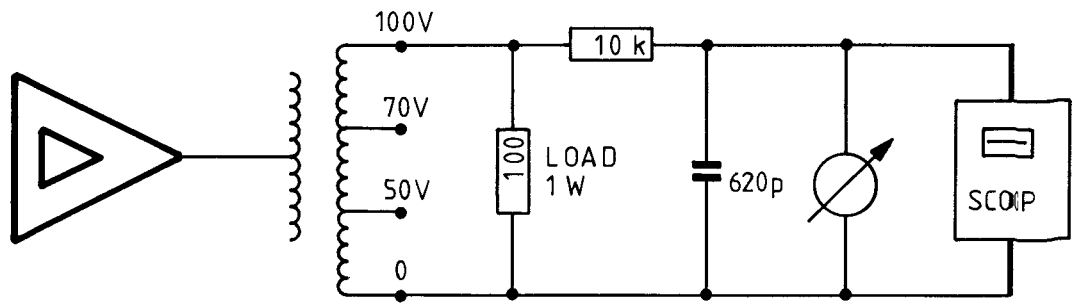
Most of the time they are short circuit.

After repairing connect only the A-PCB board on the main heatsink, use sufficient grease for the power transistors, increase slowly the mains supply be using a variac. Observe the current consumption. This should be less than 0,5 Amp. When the mains supply is at full voltage, load and check the amplifier by sending a signal through the amplifier. Connect the B-PCB boards and follow the same procedure as before. Adjust the quiescent current by turning R28 and check the maximum power on the amplifier.

Measurements

Signal-to-noise

To measure the S/N ratio use in front of the measuring equipment a fixed tap to be sure that no high frequency interference disturbs the final results.



Quiescent current

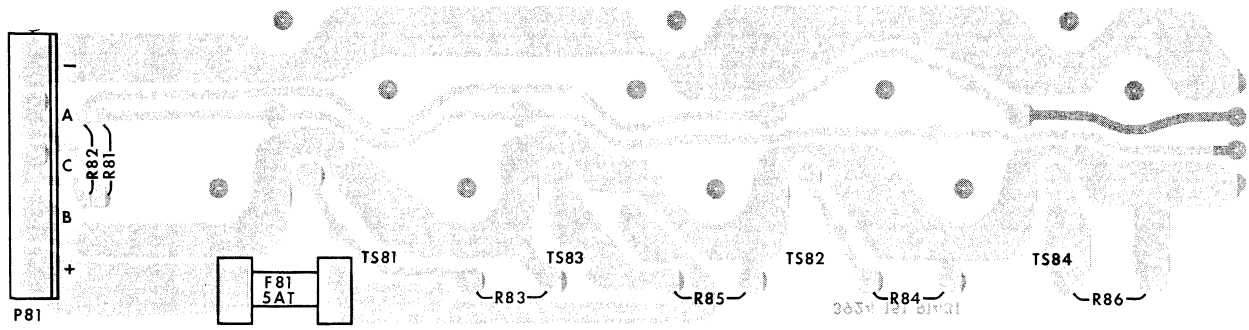
Load the amplifier with the exising loudspeakers or a resistance of e.g. 100 ohm/1W on the 100V tap. Without signal adjust by means of R28 6mV across R52 = 0,47 ohm, or 30V on point 7 on the diagram and earth or 16mA in series with R52 which can be measured on the fuse points, after removing the fuse. With signal apply 1kHz for 10V output on the 100V tap. Distortion THD must be $<$ 0,5%.

The level for the VU indicator can be adjusted by means of R47 on the printed circuit board.

6. PARTS LIST

Service code	Description			Item
	19" Rack			
4822 347 10027	VU meter			ME1
4822 255 10007	Lampholder for ME1			
5322 256 34019	Fuse holder			on Front Panel
5322 256 30247	Fuse holder set			on Front Panel
5322 267 50471	12 pole connector MATE-N-LOK			on Rear Panel
5322 321 14048	Mains Cord			
5322 267 40524	Jack holder			BU17
5322 277 10761	Mains switch			S1
5322 140 60255	Mains transformer 1303			T12
5322 140 60256	Mains transformer 1304			T12
5322 140 60257	Mains transformer 1307			T12
5322 140 60258	Output transformer LBB 1303			T13
5322 140 60261	Output transformer LBB 1304			T13
5322 140 60259	Output transformer LBB 1305			T13
5322 140 60262	Output transformer LBB 1307			T13
5322 130 32374	LED LBB 1305			LD1
5322 282 50017	Thermostat LBB 1305			S3
	Amplifier print board			
4822 124 20708	Capacitor	10UF	40V	C3
4822 124 20728	Capacitor	10UF	63V	C9
4822 124 20733	Capacitor	47UF	63V	C10
4822 124 20722	Capacitor	1UF	63V	C11
4822 124 20672	Capacitor	150UF	6,3V	C12
4822 124 20715	Capacitor	100UF	40V	C13
4822 124 20709	Capacitor	15UF	40V	C14
4822 124 20703	Capacitor	150UF	25V	C16
4822 124 20674	Capacitor	680UF	6,3V	C17/18
4822 121 42031	Capacitor	1,5UF	100V	C19/20
5322 101 34033	Potentiometer	2 x 10klog		R1
4822 116 52438	Resistor	5k6	0,5W	R10
4822 116 52452	Resistor	10k	0,5W	R19/20
4822 100 10037	Trimmer	1k	LIN	R28
4822 116 52407	Resistor	220E	0,5W	R29
4822 116 52437	Resistor	5k1	0,5W	R33/34
4822 116 52414	Resistor	300E	0,5W	R35/36
5322 116 54214	Resistor	10E	0,5W	R37/38
4822 116 52416	Resistor	330E	0,5W	R41/42
4822 100 10107	Trimmer	470k	LIN	R47
5322 115 40225	Resistor	0,47E	3W	R49-R53
4822 116 51795	Resistor	680E	0,5W	R51
5322 115 40226	Resistor	10E	3W	R55
4822 267 40325	Socket DIN	5P	180°	BU1-3
4822 130 34398	Diode	BZX79	C24	D2/3
4822 130 34328	Diode	BZX79	C30	D8
4822 130 34047	Diode	BZX75	C1V4	D9
4822 130 34233	Diode	BZX79	C5V1	D11/12
4822 130 34328	Diode	BZX79	C30	D17/18
4822 253 30029	Fuse	5A		F1
5322 280 70236	Relay	RY-24W		K1

Service code	Description		Item
5322 280 70237	Relay	MZ 24 NS	K2
5322 148 80193	Transformer input		T1
5322 209 86285	Op. Amp.	NE5534	IC1
4822 209 80617	Op. Amp.	UA741TC	IC2
4822 130 40823	Transistor	BD139	TS1/5/9
4822 130 44256	Transistor	BC557	TS2-4
4822 130 40824	Transistor	BD140	TS10
4822 130 44121	Transistor	BC338	TS7
4822 130 44104	Transistor	BC328	TS8
5322 130 42262	Transistor	BDX69A	TS11/13
5322 130 42261	Transistor	BDX68A	TS12/14
	Booster Print board		
4822 253 30029	Fuse	5 Amp.	F81
5322 115 40225	Resistor	0,47E 3W	R83-86
5322 130 42262	Transistor	BDX69A	TS81/83
5322 130 42261	Transistor	BDX68A	TS82/84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A
C
B
R82
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TS81
TS83
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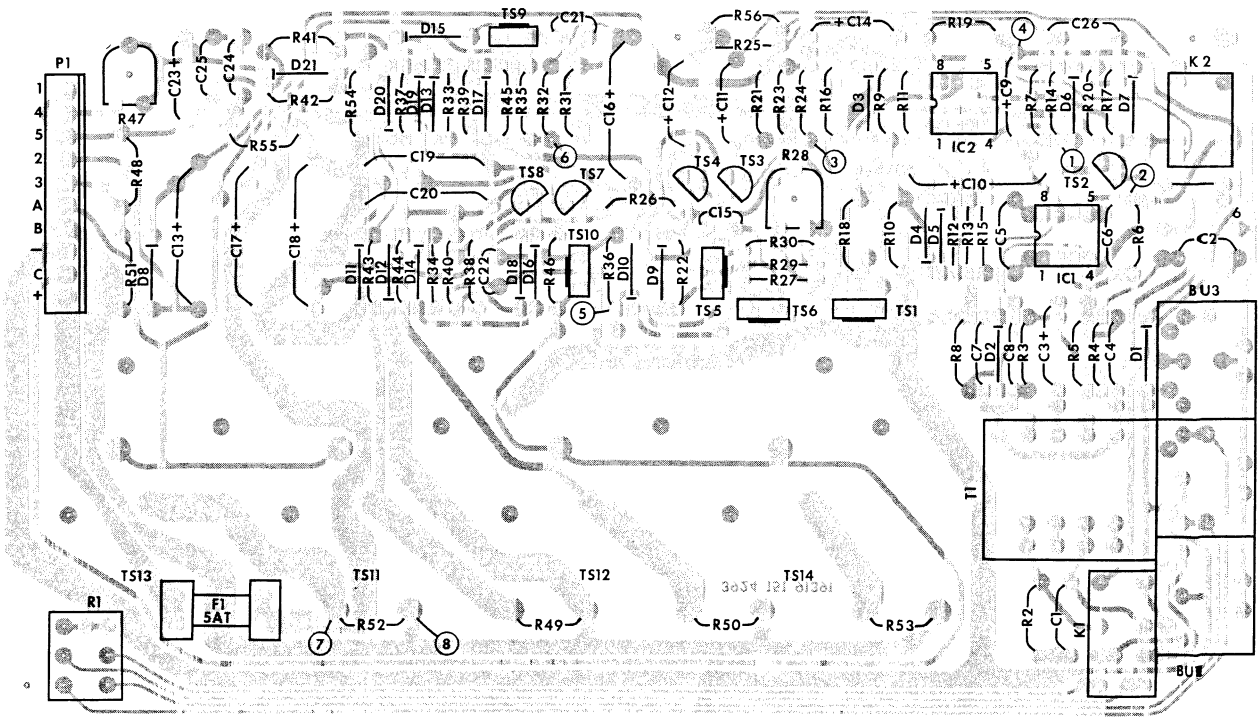
TS84
R83
R85
R84
R86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R47
C23+
C25
C24
R55
R48
C19
C20
TS8
TS7
R26
C16+
R54
D20
R37
D19
D13
R33
R39
D17
R45
R35
R32
R31
C12
R56
R25
+C14
C11
R21
R23
R24
R16
D3
R9
R11
R19
C26
IC2
+C9
R7
R14
D6
R20
R17
D7
K2
TS4
TS3
R28
+C10
TS2
C15
R30
R29
R27
R18
R10
D4
D5
R12
R13
R15
C5
IC1
C6
R6
C2
TS5
TS6
TS1
BU3
R8
C7
D2
C8
R3
C3+
R5
R4
C4
D1
T1
TS13
R1
F1
5AT
TS11
R52
TS12
R49
TS14
R50
R53
R2
C1
K1
BU1
C13+
C17+
C18+
D8
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D11
R43
D12
R44
D14
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D18
D16
R46
TS10
R36
D10
D9
R22

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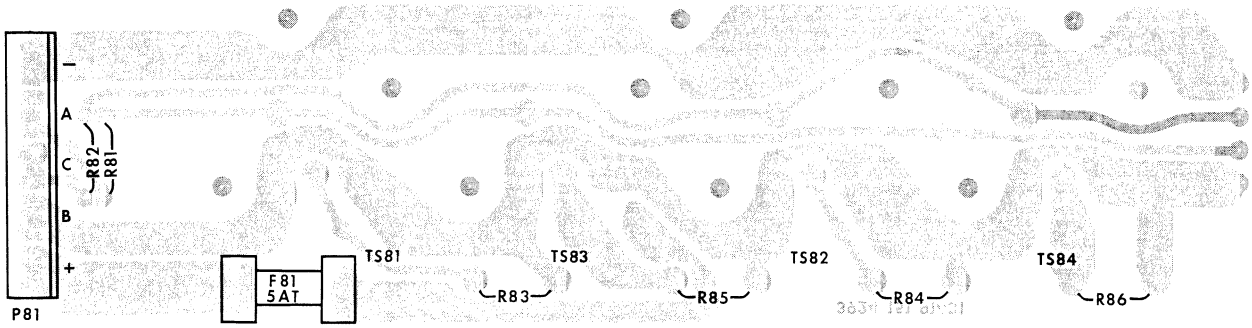
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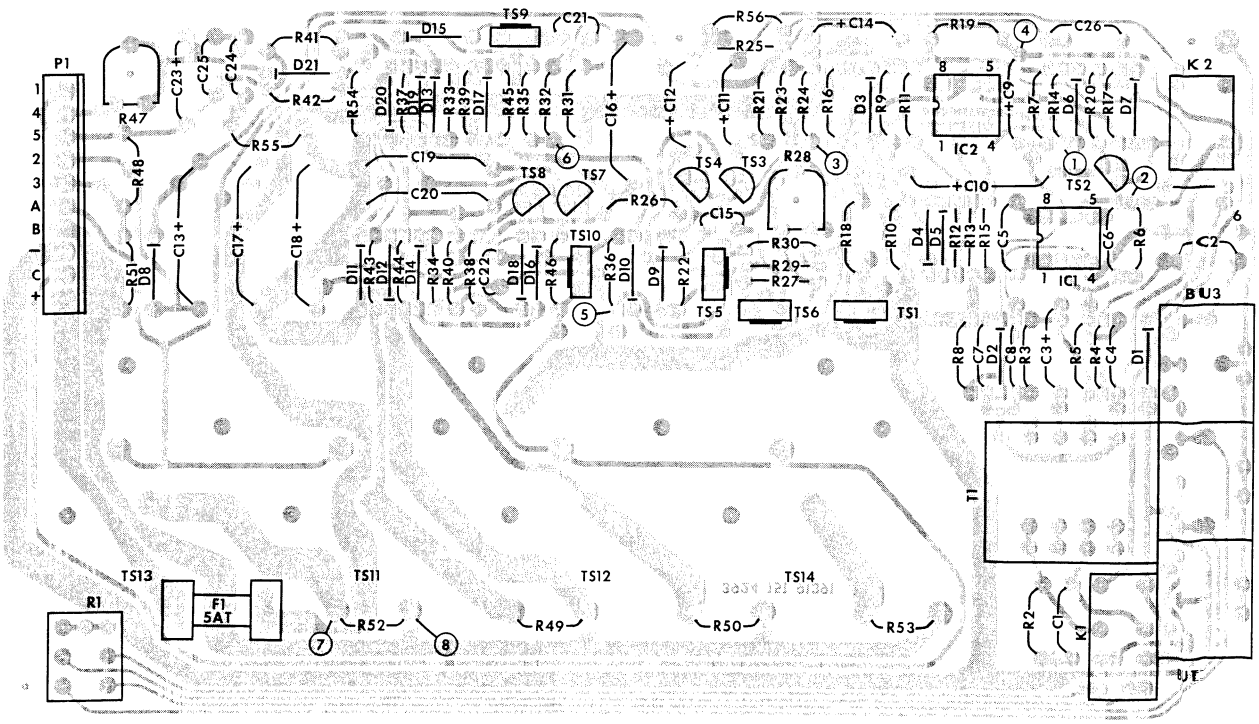
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D3
R9
R11
R19
4
C26
8
5
1
IC2
4
+C9
+C10
R7
R14
D6
R20
R17
D7
TS2
1
2
D4
D5
R12
R13
R15
C5
8
5
1
IC1
4
C6
R6
K2
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BU3
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TS13
R1
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C1
K1
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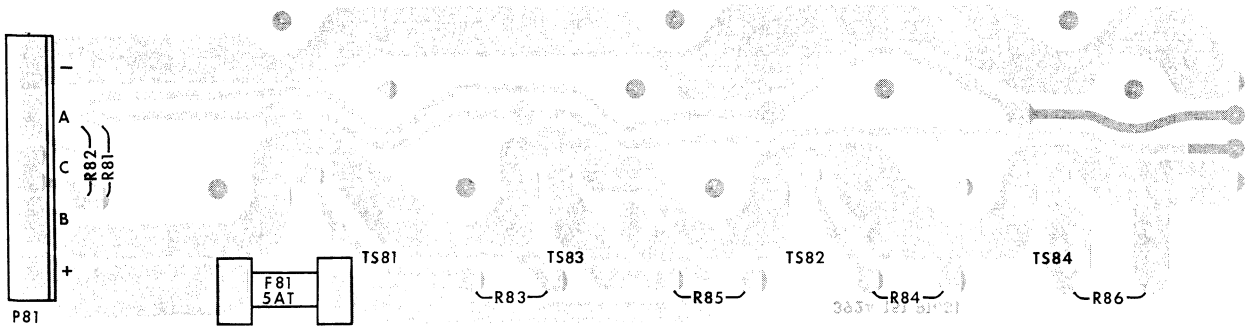
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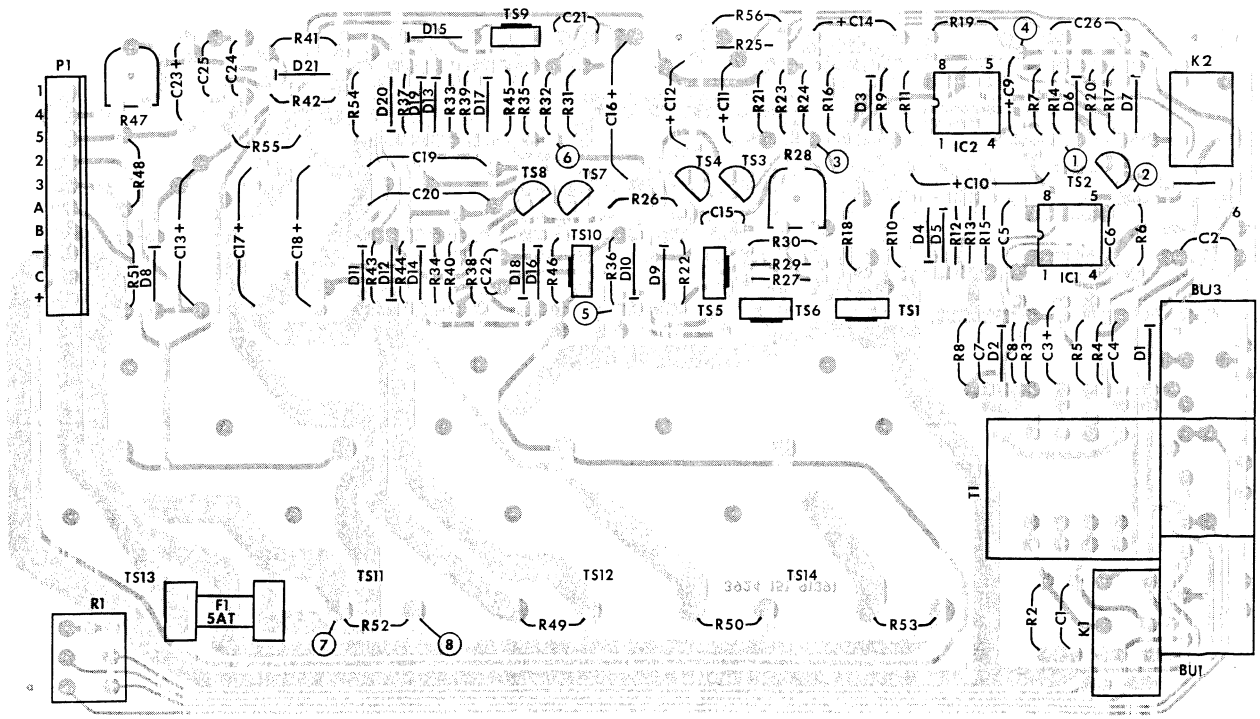
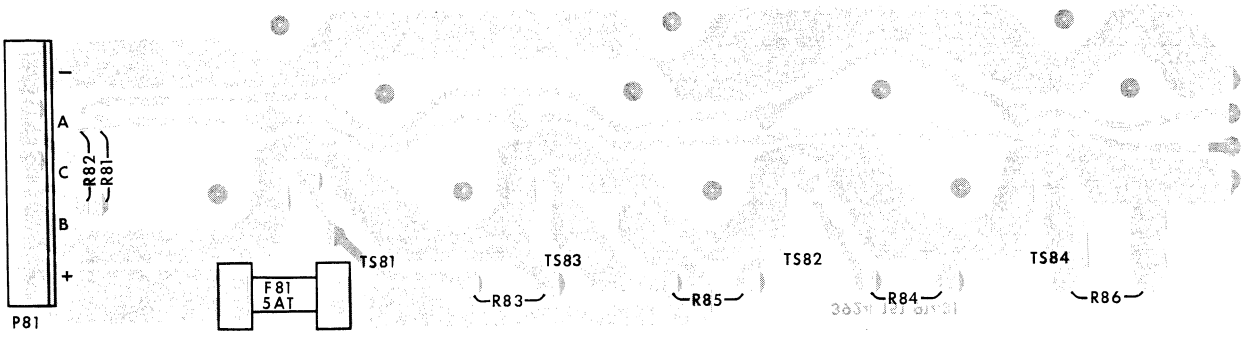
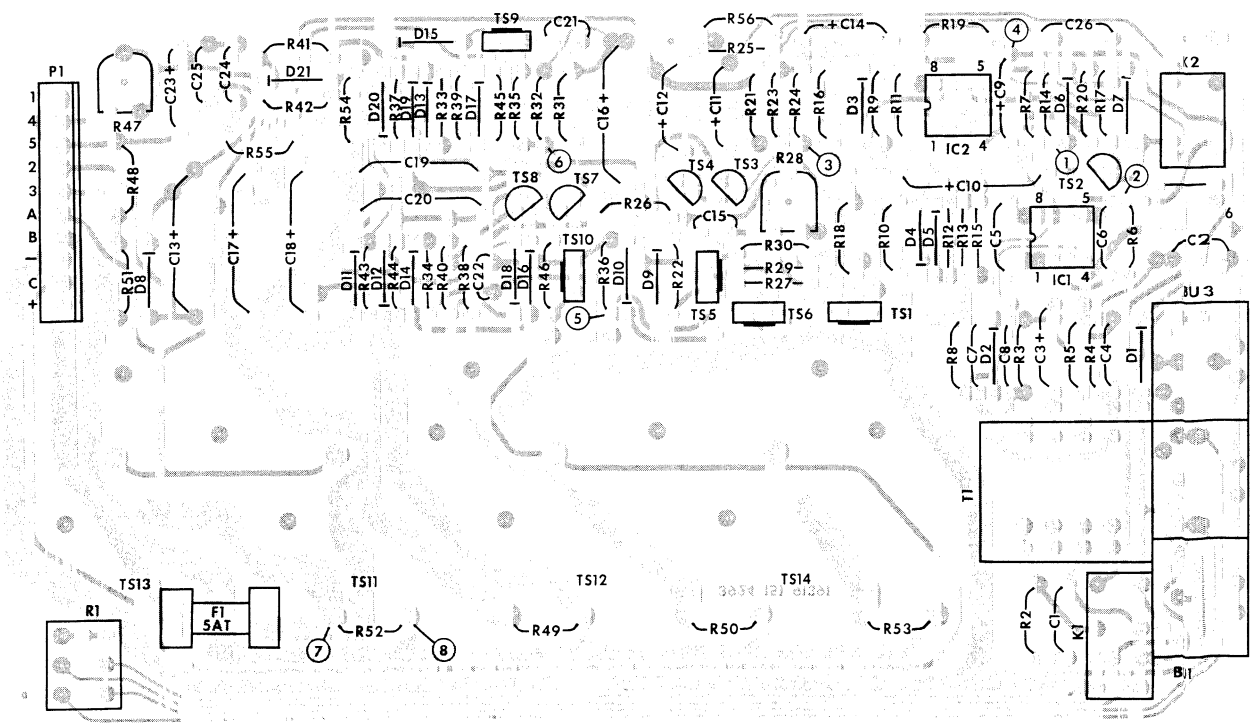
R84
R86


P1
R47
R48
R55
R41
D21
R42
R54
D15
TS9
C21
C19
C20
TS8
TS7
C16+
C12
R56
R25
+C14
R19
C26
K2
+C11
R21
R23
R24
R16
D3
R9
R11
IC2
+C9
R7
R14
D6
R20
R17
D7
TS4
TS3
R28
+C10
TS2
R26
C15
R30
R29
R27
TS10
TS5
TS6
TS1
R18
R10
D4
D5
R12
R13
R15
C5
IC1
C6
R8
C2
BU3
R8
C7
D2
C8
R3
C3+
R5
R4
C4
D1
T1
TS13
F1
5AT
R1
TS11
TS12
TS14
R52
R49
R50
R53
R2
C1
K1
BU1

| | | |

| | | |


P81
R82
R81
TS81
F81
5AT
TS83
TS82
TS84
R83
R85
R84
R86


P1
R47
R48
R51
D8
C23+
C25
C24
C13+
C17+
C18+
R41
D21
R42
R55
R54
D20
R37
D19
D13
R33
R39
D17
TS9
C21
D15
C19
C20
TS8
TS7
C16+
R26
R45
R35
R32
R31
D11
R43
D12
R44
D14
R34
R40
R38
C22
D18
D16
R46
TS10
R36
D10
D9
R22
R56
R25
+C14
+C12
+C11
R21
R23
R24
R16
TS4
TS3
R28
C15
R30
R29
R27
TS5
TS6
TS1
R18
D3
R9
R11
R10
R19
C26
IC2
+C9
R7
R14
D6
R20
R17
D7
K2
+C10
TS2
D4
D5
R12
R13
R15
C5
IC1
C6
R6
C2
BU3
R8
C7
D2
C8
R3
C3+
R5
R4
C4
D1
T1
TS13
F1
5AT
R1
TS11
R52
TS12
R49
TS14
R50
R53
R2
C1
K1
B1

Service
Service
Service Information

electro acoustics division

Philips Export B.V.
Eindhoven, The Netherlands

cat.	**DOCUMENTATION CHANGES**	**NR. DC061**	**DC061PA015**	date **26.02.1985** rev.
art. gr.	**PUBLIC ADDRESS**	nr. **PA015**		sheet **1** of **1**

Product : AMPLIFIERS LBB 1303, 1304, 1305 and 1307

Service manual : 4822 733 24128

Reason : The above mentioned service manual has to be corrected as below.

Contents :

1. In the block diagram 1.1. The relay coil is by mistake drawed as if it is internally connected to earth. This must be the positive supply voltage.

2. In the technical data (2.) the following AC fuses must be alterated:
   T 2.5 A must be T 1.6 A
   T 5 A must be T 3.15 A
   T 10 A must be T 6.3 A
   T 20 A must be T 15 A

   The DC fuse remains T 5.0 A and for the service code numbers see point 4 of this information.

3. For adjusting the quiescent current and checking the distortion (page 12). The following instructions are correct:
   a. Connect the 100 V tap of the amplifier to the existing loudspeakers or to a 100 ohm/1 W resistor.
   b. Adjust without input signal R28 causing 8 mV across, or 7 mA through R52 (0.47 ohm).
   c. Checking the distortion. Connect a 1000 Hz signal and adjust it so that there is 10 V output on the 100 V tap. Distortion THD must be 0.5%.

4. On the service parts list (page 13):

   Alterated:
   Capacitor C12 = 150 µF 6.3 V must be 68 µF 6.3 V code number 4822 124 20672.

   Added:

Cap. C37 6800 µF/100 V	5322 124 40814
S4 Thermal fuse over R13 (LBB 1307 only)	5322 252 20127
Transistor TS11/13 BDX 67	5322 130 42349
Transistor TS12/14 BDX 66	5322 130 44742
Fuse T 1.6 A	4822 253 30024
Fuse T 3.15 A	4822 253 30027
Fuse T 5 A	4822 253 30029
Fuse T 6.3 A	4822 253 30031
Fuse T 15 A	4822 253 30033

G. v.d. Waals

PHILIPS

Service Information

Advanced Automation Systems
Audio-communications
Broadcast Equipment
Electronic Security & Recording Systems
Industrial Automation
Scientific & Analytical Equipment
Test and Measurement

Industrial & Electro-acoustic Systems Division

cat. **DOCUMENTATION CHANGES**	nr. **DC079**	**DC004PA016**	date **08.11.1985** rev.
art. gr. **PUBLIC ADDRESS**	nr. **PA016**		sheet **1** of **5**

Product : POWER AMPLIFIER LBB 1303/00, 1304/00, 1305/00, 1307/00

Service Manual : 4822 733 24128

Reason : Technical and appearance alterations. To indicate these alterations, the /00 should be changed into /01.

Contents :

1. The original versions of the SQ40 range which have black front panels have been superseded by updated versions with beige coloured front panels and brown handles.

2. New fuse values for /01 and /00.

	F12	220/240 V	code number	110/127 V	code number
LBB 1303		2.5 A	4822 253 30026	5 A	4822 253 30029
LBB 1304		5 A	4822 253 30029	10 A	4822 253 30032

3. Errata on service information DC061PA015:
   Point 3b. Adjust without input signal R28 causing 8 mV across or 16 mA through R52 (0.47 ohm).
   Point 4. Transistors TS11/13 BDX67 TS12/14 BDX66 have to be BDX67A and BDX66A.

4. New input sensitivities:
   Priority and music input at 1 kHz and rated output: 200 mV +/- 1 dB.
   Test input at 20 kHz and rated output -3 dB: 160 mV +/- 3 dB.
   R6/C6 have to be changed from 39 kOhm into 91 kOhm, from 100 PF into 27 PF.

5. Signal to noise ratio: > 77 dB at rated input.

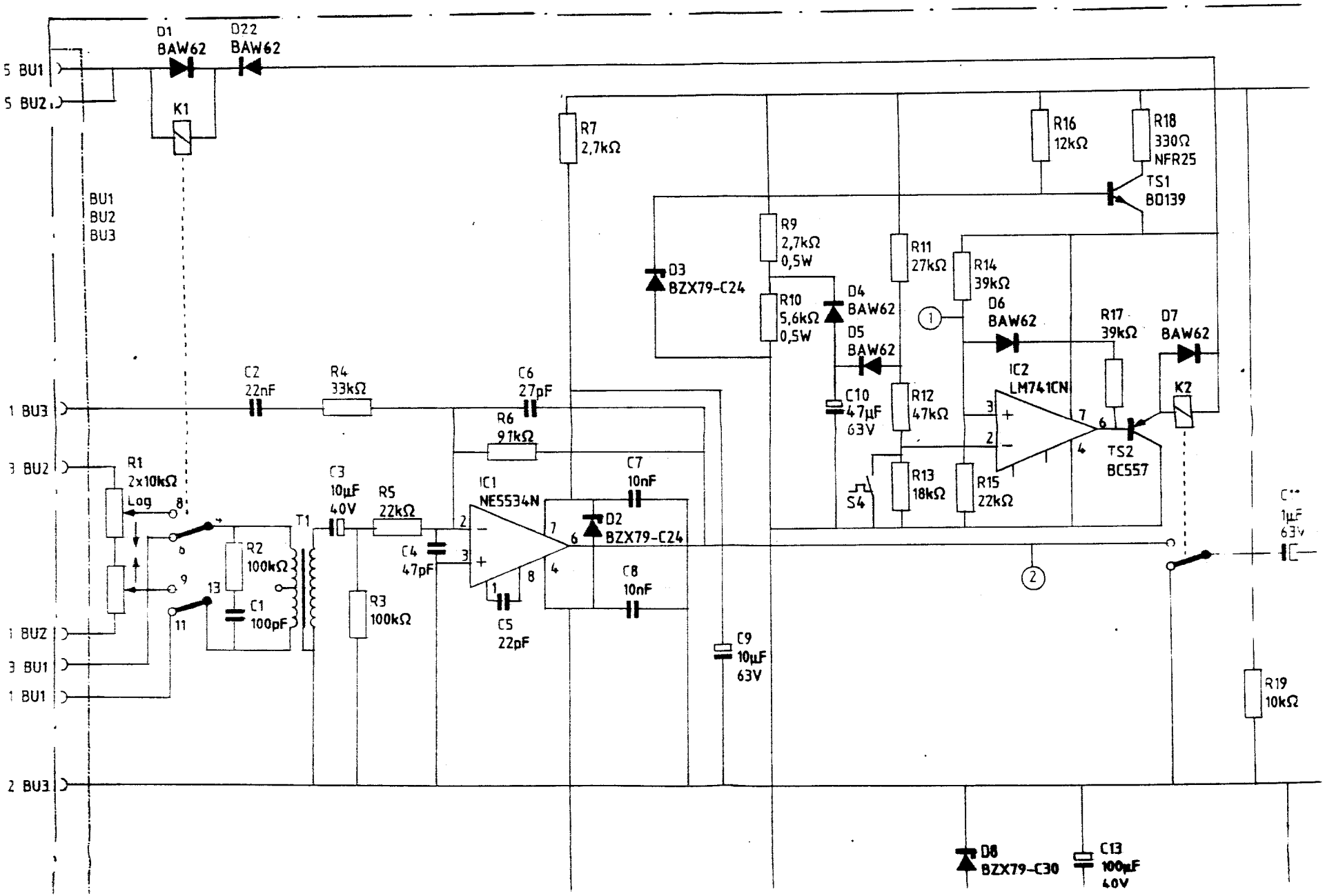
6. Adding diode D22. This diode prevents creepage current when more amplifiers are connected together via the interconnection point 5BU1, 5BU2.

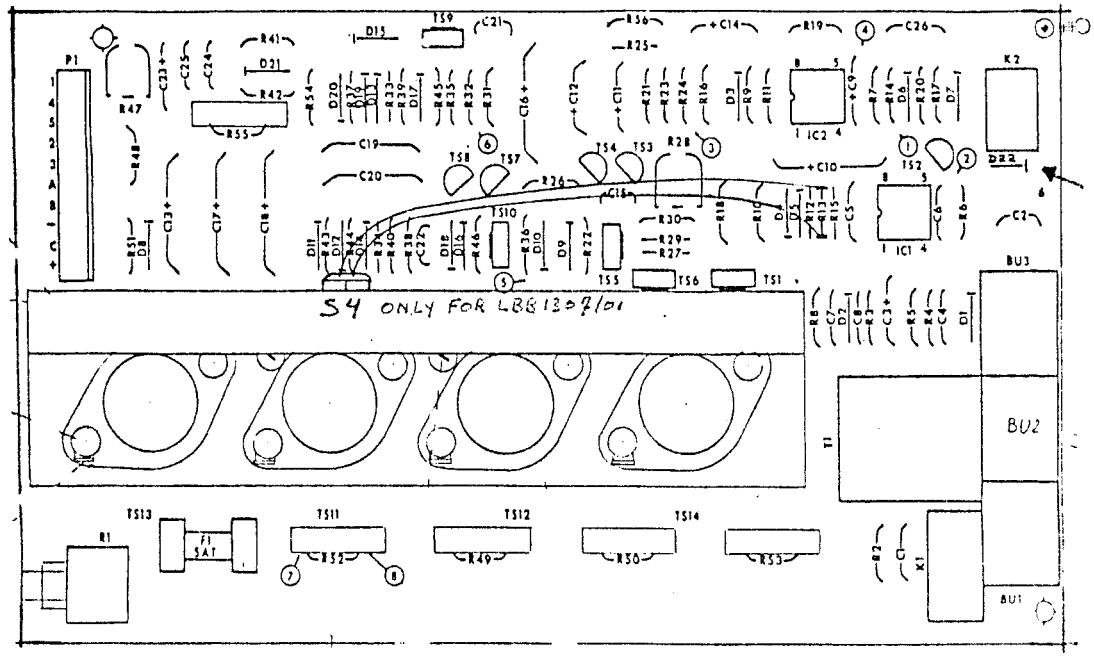
continued on page 2

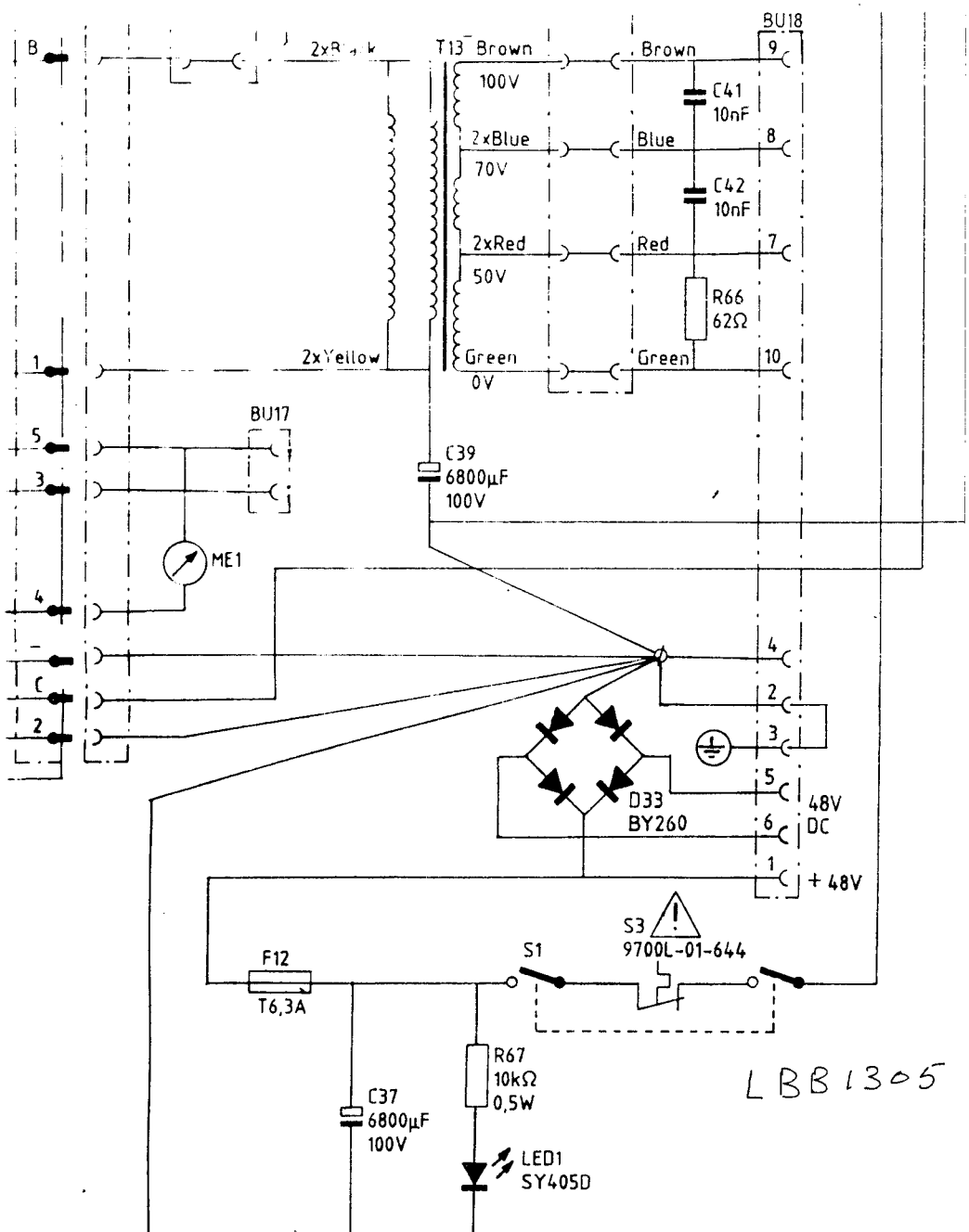
7. Adding two connection points 5 and 6 for battery supply input on output terminal block 12-pole MATE-N-LOK.
   Battery supply: +/o 48 V
   Polarity on points 5 and 6: reversable
   Adding rectifier: D33 for LBB 1303/01 and LBB 1305/01
   Type: BY260 code number 5322 130 31492
   Rectifier: D33 for LBB 1304/01
   Type: KBPC 25-02 code nr. 5322 130 34587
   Rectifier: D33 for LBB 1307/01
   Type: KBPC 35-02 code nr. 5322 130 32375

G. Haselager

continued on page 3

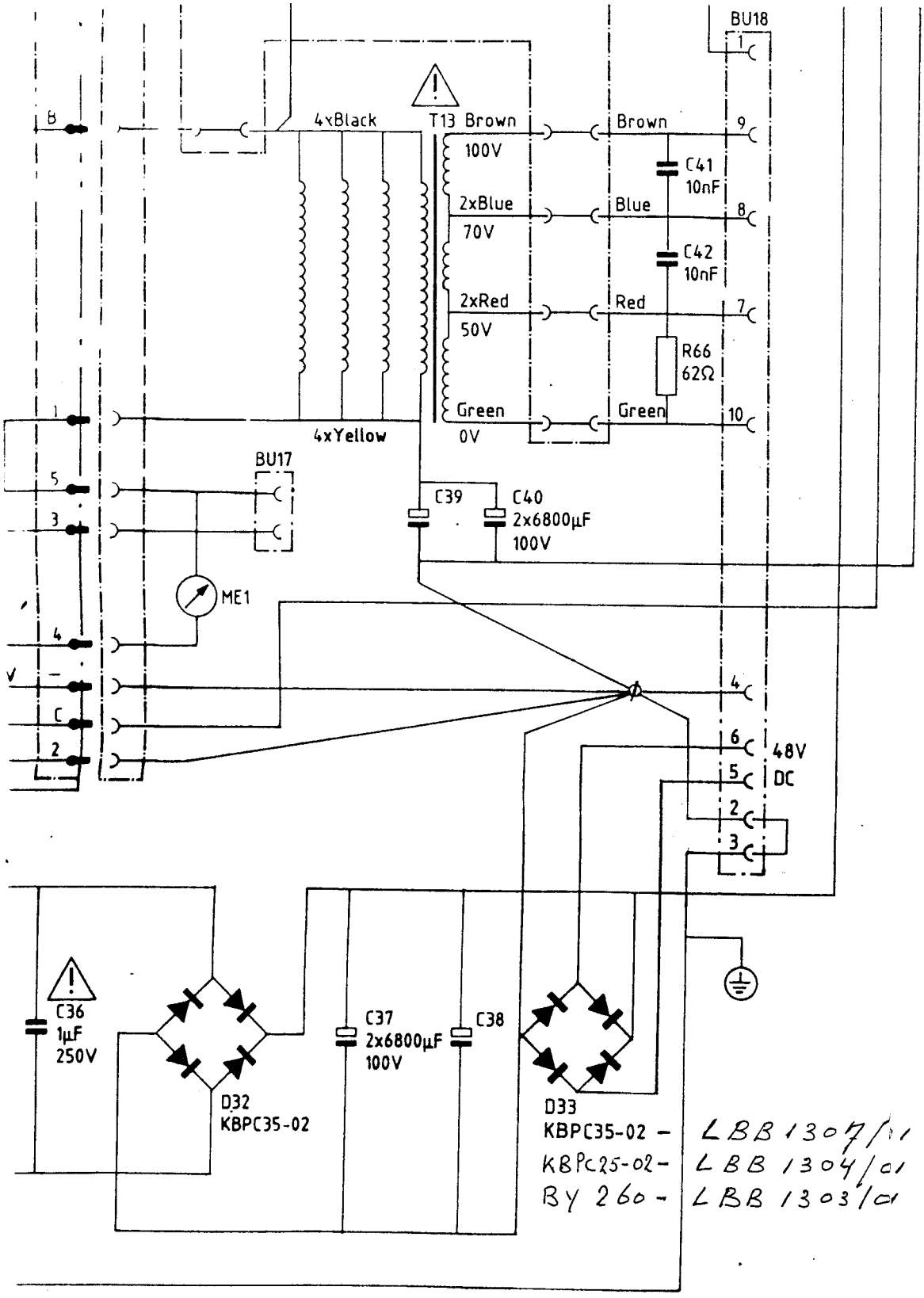

D1
BAW62
D22
BAW62
5 BU1
5 BU2
K1
BU1
BU2
BU3
R7
2,7kΩ
R16
12kΩ
R18
330Ω
NFR25
TS1
BD139
R9
2,7kΩ
0,5W
D3
BZX79-C24
R10
5,6kΩ
0,5W
D4
BAW62
D5
BAW62
R11
27kΩ
R14
39kΩ
D6
BAW62
R17
39kΩ
D7
BAW62
IC2
LM741CN
K2
C10
47µF
63V
R12
47kΩ
TS2
BC557
S4
R13
18kΩ
R15
22kΩ
C2
22nF
R4
33kΩ
C6
27pF
R6
91kΩ
1 BU3
3 BU2
R1
2x10kΩ
Log
C3
10µF
40V
R5
22kΩ
IC1
NE5534N
C7
10nF
D2
BZX79-C24
T1
R2
100kΩ
C1
100pF
C4
47pF
R3
100kΩ
C5
22pF
C8
10nF
C9
10µF
63V
1µF
63V
R19
10kΩ
1 BU2
3 BU1
1 BU1
2 BU3
D8
BZX79-C30
C13
100µF
40V

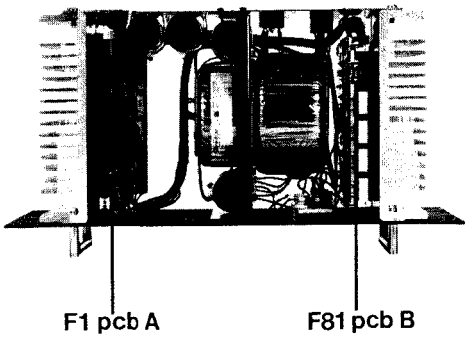


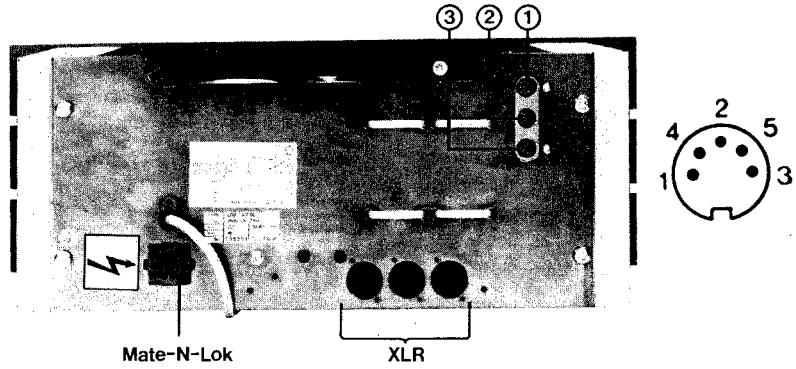


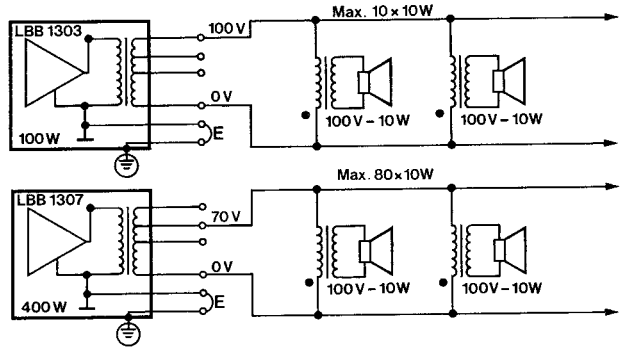
LBB1305

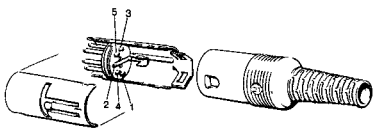
DC079PA016


BU18
4xBlack
T13 Brown
100V
2xBlue
70V
2xRed
50V
Green
0V
4xYellow
Brown
Blue
Red
Green
C41
10nF
C42
10nF
R66
62Ω
BU17
C39
C40
2x6800µF
100V
ME1
48V
DC
C36
1µF
250V
D32
KBPC35-02
C37
2x6800µF
100V
C38
D33
KBPC35-02 - LBB 1307/01
KBPC25-02 - LBB 1304/01
BY 260 - LBB 1303/01









5-pole 180° DIN